

FIRST STAGE RAINFALL SAMPLER

BACKGROUND OF THE INVENTION

1. Field of the Invention.

The present invention relates to a first stage rainfall sampler, in particular to a first stage rainfall sampler for sampling a first stage rainfall, such as acid rain, step by step, into a plurality of containers.

2. Description of the Prior Art

In the case where a rainfall is sampled every 1 mm of rain in a first stage step by step method, a water-sampling bottle 42 provided with a float stopper 41, as shown in for example FIG. 10, has been used. In this case, a sampler 44, in which a plurality of the water-sampling bottles 42 are arranged in a housing portion 43 step by step, as shown in FIG. 9, has been used. In this sampler 44, when the rainfall is detected by a rain sensor 45, a cover member 47 covering a funnel 46 provided in an upper portion of the housing portion 43 is opened to introduce the rainfall at first into a water-sampling bottle 42, which is uppermost arranged, within the housing portion 43, through a conduit 48, and when the water-sampling bottle 42 is filled with the rainfall, the water-sampling bottle 42 is closed by the float stopper 41. The rainfall is then introduced into the next water-sampling bottle 42 by a distributing funnel 49. Subsequently, the rainfall is introduced into the respective following water-sampling bottles 42 in turn step by step.

In the above described sampling method by the use of the water-sampling bottle 42, problems have occurred in that the water-sampling bottle 42 is provided with the float stopper 41 and thus complicated in construction, so that it is not easy to wash the water-sampling bottle 42. In addition, the water-sampling bottle 42 is fixed in volume, so that, in the case where the first stage rainfall is designed to be sampled more finely, for example for every 0.5 mm, the water-sampling bottle 42 or the funnel 46 must be exchanged. In addition, in the case where the first stage rainfall is sampled for every 6 mm or more, the sampler 44 itself is considerably increased in size and weight and thus a high and wide space is required. Thus, for example, selection of an installation site, installation work or transfer and the like are not easy. Furthermore, the cover member 47 of the funnel 46 must be automatically opened and closed by a motor, so that a power source, an additional source of problems, is required.

SUMMARY OF THE INVENTION

The present invention has been achieved taking the above described circumstances into consideration and it is an object of the present invention to inexpensively provide a handy first stage rainfall sampler capable of automatically sampling a first stage rainfall step by step without requiring motive power, which is easy to install and transfer, and easy to wash sampling containers.

In order to achieve the above described object, the present invention has the following construction. An outlet port of a rainfall receiver provided on an openable and closable housing is formed downward within the housing, a tumbler, which is supported by a support member so as to revolve within a vertical plane, is provided within the housing so as to be easily taken in and out of the housing. A plurality of sampling containers are swingably and detachably hung down from the same circumference of the tumbler at intervals so as to correspond to the outlet port in turn, and the tumbler is

provided with a weight for variable forming a balanced condition between it and a sampled rainfall.

When rainfall is collected by a rainfall receiver provided on the housing and subsequently poured into a first sampling container drop by drop through the outlet port, a balance between a predetermined weight and the tumbler is changed depending upon the quantity of rainfall poured into the first sampling container drop by drop to revolve the tumbler little by little until the next sampling container lines up with the outlet port to sample the remaining rainfall similarly. A balance condition between the weight and the tumbler is further changed depending upon the quantity of rainfall poured into the next sampling container drop by drop until a further subsequent sampling container corresponds to the outlet port. Subsequently, the balance condition between the quantity of rainfall sampled in the sampling container and the weight is variable changed in turn, whereby an appointed quantity of rainfall is automatically sampled in the respective sampling containers. In short, the rainfall can be automatically sampled step by step without requiring a motive power by the change of balance between the sampled rainfall and the weight in weight.

Such a sampler can be formed of lightweight and compact by making it from, for example, transparent acrylic resin materials and inexpensively provided in the form of an easily carriable and handy design. In addition, the construction that the respective sampling containers are detachably hung down from the tumbler is simple, so that, if the tumbler is taken out of the housing to remove the respective sampling containers, washing and the like can be easily conducted.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a longitudinally cross-sectional front view showing one preferred embodiment of a first stage rainfall sampler according to the present invention;

FIG. 2 is a longitudinally cross-sectional side view showing the first stage rainfall-sampler;

FIG. 3 is a partial cross-sectional view showing the first stage rainfall sampler;

FIG. 4 is an exploded perspective view showing essential parts in the first stage rainfall sampler;

FIG. 5 is an operation diagram showing a first stage condition of the first stage rainfall sampler;

FIG. 6 is an operation diagram showing a final stage of the first stage rainfall sampler;

FIG. 7 is a perspective view showing essential parts in the first stage rainfall sampler according to another preferred embodiment;

FIG. 8 is a side view showing the first stage rainfall sampler;

FIG. 9 is a partially cutaway front view showing one example of the conventional sampler; and

FIG. 10 is a cross-sectional view showing a sampling bottle.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

The present invention will be described with reference to the preferred embodiments thereof.

A first stage rainfall sampler in the present preferred embodiment can sample about several millimeters of first stage rainfall in seven divided stages and has the following construction.